If I ſhould deſcribe them with a thouſand inſtances and relations, and make mention of ſo many particulars, ſtill there would not be a part in ten that I could bring within the compaſs of writing. But theſe few particulars I ſend for your excellency's information.

XL. *An Account of an Earthquake in the* Eaſt Indies, *of two Eclipſes of the* Sun *and* Moon, *obſerved at* Calcutta: *In a Letter to the Reverend* Thomas Birch, *D. D. Secret. R. S. from the Reverend* William Hirſt, *M. A. F. R. S.*

To the Reverend Thomas Birch, *D. D. Secretary to the Royal Society.*

Reverend Sir, Calcutta, Nov. 3d 1762.

Read Nov. 17, 1763. TO the incloſed accounts of the tranſit of Venus, I have ſubjoined others of an extraordinary earthquake felt in this part of the world, which, I flatter myſelf, will not be unacceptable to the Royal Society. This earthquake happened the ſecond day of April laſt, was very violent in the kingdoms of Bengal, Aracan, and Pegu, but particularly at the metropolis of Aracan, where, according to the accounts of an Engliſh merchant reſiding there, the effects have been as fatal as at Liſbon,

bon, and where it is thought the chief force of the earthquake vented itſelf.

At Dacca, in this kingdom of Bengal, the conſequences have been terrible: the riſe of the waters in the river was ſo very ſudden and violent, that ſome hundreds of large country boats were driven aſhore, or loſt, and great numbers of lives loſt in them.

No leſs deplorable are the accounts from Chattigaon in this ſame kingdom: three of theſe accounts I herewith incloſe, one of them wrote by Mr. Edward Gulſton, a young gentleman in the ſervice of our Eaſt India Company, and two others, tranſlations from a Perſian original, made out by order of Mr. Verelſt, chief of our Eaſt India Company's affairs in that province; in conſequence of which account the Company's lands there, have not been ſo highly aſſeſſed as before this calamity. Both theſe accounts are tranſlated from the ſame original; but that, which I received from governor Vanſittart, being thought exaggerated for intereſted reaſons, I begged of Mr. Gulſton to give me a litteral tranſlation from the Perſian, in which language he has made an uncommon progreſs, as much to his preſent honour, as I hope it will be to his future advantage. This favour he obligingly granted me, and I ſend it to you, Sir, not only to compare it with the other tranſlation, but to give you ſome diſtant idea of the idiom and great ſimplicity of this eaſtern language.

The ſame earthquake was alſo very alarming at Ghirotty, where colonel Coote with His Majeſty's troops are in cantonment about 18 miles up the river from this place. The waters in the river and tanks there were violently agitated, and, in many places,

roſe to more than ſix feet perpendicular height, of which I had ocular conviction myſelf on my return from Chandernagore, a ſettlement lately belonging to the French, about three miles north from Ghirotty, and in latitude 22° 54′ N. where it was felt, but not in a great degree; for I myſelf knew nothing of it, till it was ſoon after told me by certain French gentlemen there.

Nearly at the ſame time was this earthquake felt at Calcutta, where, as I am informed, the agitation of the waters in the tanks roſe upwards of ſix feet, and was in the direction north and ſouth. The height of the thermometer on Farenheit's ſcale was then at Calcutta at 95° 30′ much higher than it had been obſerved to be during the whole month, the loweſt deſcent of the mercury being 89 degrees. In this month was much thunder and lightening, and there were freſh gales of wind at S.E. the weather in general being cloſe and ſultry.

A ſubſequent earthquake was felt at Calcutta the 13th of July following at half paſt two in the afternoon. The thermometer was then at 87° 4′ at a medium, the wind S.W. and the weather fair: to this I was a witneſs myſelf, being then at dinner with captain Eiſer, of his majeſty's 84th regiment. The motion of the earth cauſed a very ſenſible vibration of the wine in our glaſſes, and the ſhock was repeated twice at the interval of a few ſeconds.

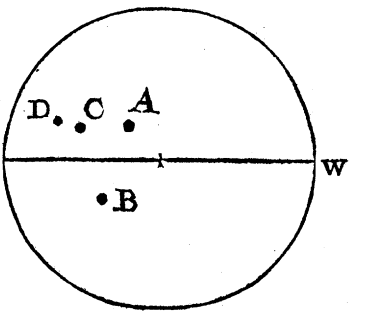
I conclude, Sir, with communicating to you the obſervations I made in theſe parts, of two remarkable eclipſes of the Sun and Moon. The firſt was of the Sun, which I obſerved at Ghirotty on the banks of the Ganges, October 17th ult. where I

was then on a viſit to colonel Coote. This indeed was a flying obſervation, or taken, as the French would ſay, en paſſant, being unprovided with a neceſſary apparatus. I had luckily adjuſted (very carefully) my watch to apparent time, by the meridian line of a large ſundial, on the noon immediately preceding the eclipſe: my watch in general keeps time very well, but it not having a hand to ſhew ſeconds, I determined the ſeconds as near as I could by the minute hand. Though I had ſet my watch to the apparent time, I deſpaired of making any obſervation of this eclipſe for want of a teleſcope, for which, happening to expreſs ſome concern, not above half an hour before the eclipſe was to come on, captain Eiſer recollected he had a reflector, with which he immediately obliged me: it was about 16 inches long, and in very tolerable condition, ſo that I may venture to ſay this obſervation, though not perfect, may be depended on to be very near the truth.

I had not time nor conveniency to throw the Sun's image on a ſcreen in a darkened room; ſo was obliged to lay it down as near as I could by my eye. The following ſcheme ſhews the ſolar maculæ, as they then appeared: the appulſe of the Moon's limb to, and it's receſs from them, being reſpectively noted by the literal references.

N. B. I examined my watch by the meridian line the ſucceeding noon of the eclipſe, without being able to aſcertain any ſenſible error, owing doubtleſs to the want of a better method of making the obſervations.

Obſervations of a ſolar eclipſe made at Ghyrotty about the latitude 22° 51 north, the watch adjuſted to apparent time.



	H	M	S
Beginning of the lunar immerſion - - - -	2	49	30
Appulſe of the Moon's eaſtern limb to the ſpot A - - - - - - - - - - - - - -	3	35	48
Appulſe of the ſame to the ſpot B - - - -	3	41	42
Appulſe of the ſame to the ſpot C - - -	3	49	43
Appulſe of the ſame to the ſpot D - - -	3	53	0
Greateſt viſible obſcurity near 11 degits eclipſed - - - - - - - - - - - - - -	4	5	38
The Moon's weſtern limb receding from the ſpot A - - - - - - - - - - - - - -	4	46	50
The ſame receding from the ſpot B - - -	4	50	20
The ſame receding from the ſpot C - - -	5	0	8
The ſame receding from the ſpot D - - -	5	3	35
End of the eclipſe - - - - - - - - - -	5	12	20
Total duration - - - - - - - - - - - -	2	22	50

The next obſervation was of the eclipſe of the Moon, which I made yeſterday in Conjunction with Mr. Hancock, at his houſe in Calcutta, to whom I am greatly obliged for ſupplying me with ſome excellent aſtronomical inſtruments, particularly with a large land quadrant of two feet radius, made by Cole in Fleet-ſtreet, with which I took the correſ-

pondent altitudes of the Sun to adjuſt his watch (which was furniſhed with a hand to diſtinguiſh ſeconds) to the apparent time, Mr. Hancock himſelf marking the Times while I obſerved. The teleſcope I uſed was a reflector made by Dollond, in perfect order, being ſent out of England by the laſt ſhips, and in length about 22 inches.

Our firſt obſervation was on November the firſt, the day preceding the eclipſe, the Sun's upper limb being at the horizontal wire of the quadrant's movable teleſcope, on the eaſtern ſide of the meridian when the watch marked - - - -

		By the watch H M S
		9 50 30
Nov. 1. ☉ Altitude, 47° 8′	Sun's upper limb at the ſame on the weſtern ſide - - - - - - - -	14 24 31
	Dividing the Sum by - - - - - 2	24 15 1
	Sun's center on the merid. by the watch	12 7 30
	Equation of the day - - - - -	11 43 49
	Watch faſter than equated ſolar time -	0 23 41
Nov. 2, ☉ Altitude, 51° 26′.	Sun's upper limb at the horizontal wire on the eaſtern ſide - - - - -	10 24 33
	The ſame at the ſame on the weſt ſide -	13 59 50
	Dividing the Sum by - - - - - 2	24 24 23
	Sun's center on the merid. by the watch	12 12 11
	Equation of the day - - - - -	11 43 48
	Watch faſter than equated ſolar time -	0 28 23
	Watch faſter yeſterday - - - -	0 23 41
	Gain of the watch theſe 24 hours - -	0 4 42

Obſervations

Obſervation of a lunar eclipſe November 2, 1762, made at Calcutta in the kingdom of Bengal, latitude 22° 30′ N.

Immerſions.	By the watch. H M S	Apparent time. H M S
The beginning of the eclipſe at - -	1 15 10	1 7 40
Mare Humorum immerging - - -	1 24 54	1 17 24
Tycho immerging - - - - - - -	1 36 30	1 29 0
The ſhadow at the middle of Copernicus	2 9 33	2 2 3
Emerſions.		
Middle of Copernicus emerging -	2 50 27	2 42 57
Total emerſion of Tycho - - -	3 44 30	3 37 0 doubtful
End of the eclipſe - - - - - -	4 3 2	3 55 32
Total duration - - - - - - -	2 47 52	2 40 22

Near eight digits eclipſed by ocular eſtimation.

By the preceding obſervations the watch gained 4 minutes 42 ſeconds theſe 24 hours.

I have the honour to be,

SIR,

Your obliged and very humble ſervant,

William Hirſt.

XLI. *Extract*